Plunket (J. D.)

BOVINE TUBERCULOSIS,

A FRUITFUL SOURCE OF

HUMAN DISEASE AND DEATH.

BY

J. D. PLUNKET, M. D.,

OF NASHVILLE, TENN.,

MEMBER OF THE STATE BOARD OF HEALTH, AND ITS COMMITTEE ON THIS SUBJECT.

REPRINTED FROM THE SECOND REPORT OF THE STATE BOARD OF HEALTH.
(*January* 1, 1885.)

Presented by the author

BOVINE TUBERCULOSIS.

Dr. Robert Koch, in an address delivered in March, 1882, before the Physiological Society of Berlin, upon "The Etiology of Tubercular Disease," says: "One-seventh of the deaths of the human race are due to tubercular disease," and recently published statistics, while probably below the actual facts, show that, in 1880, there occurred, leaving out fractions, ninety-five thousand deaths from the one single cause—consumption, in the United States alone.

Any influence, then, which tends to bring about so great destruction and distress to the human family deserves certainly the most pains-taking and exhaustive investigation, and, as far as it may be possible, its abatement or mitigation.

To this end, therefore, has this paper been prepared, that the facts herein contained, and which are but recent in their discovery, may be more widely scattered among the people for their information and guidance, and with the hope of obtaining the practical result of establishing, under the sanction of law, a system of inspection by which the danger of partaking of infected meat and milk may be reduced to the minimum.

Certain zoological affinities between man and the lower order of animals have, in recent time, provoked much speculation among philosophers and naturalists. Yet, impressed as we are, no aspect of the subject is so full of practical interest and instruction, so full of weal or woe to the race, as that to be derived from a careful study of the pathological relations of the two. For our present purposes, we

restrict the scope of this paper to a brief consideration of the danger of communicating diseases, especially such as are tuberculous in their nature, to man through the use of food products of infected animals. From a broad statement of fact we learn that the skeletal frame work and internal organization of the higher mammalia are not only morphologically identical with the structure of man, and thus subserve the same purpose in animal economy; but the blood is similar in chemical composition, contains the same anatomical elements, and is subject to analogous changes in disease; hence, in the use of food products of infected animals the danger of communicating to man some virulent blood poison is always imminent, for "nowhere in the struggle of life against the manifold causes of disease," it has been truly said, "do we more effectually imperil our health and happiness, than in partaking of animal food of a suspicious character." Much effort has been made in this direction during the recent past, and many facts of importance have been brought to light; yet, practically, we are but still only upon its threshold, and what occasions most regret is that the accomplished laborers engaged in this wide field of scientific research at this time, are, in reality, but few.

However, it is suggested that the time has now arrived when the sanitarian and physician should no longer neglect it, but, with zeal kindled afresh, press forward to the exploration of this realm in the causation of disease, and thus more accurately survey those boundary lines in pathology which now seem to separate the human maladies from those of our food-producing animals. Here, no doubt, will be realized one of the highest and most important achievements in medical science, as through knowledge thus obtained, we will be able to indicate causes of human disease now scarcely suspected, or but dimly comprehended. Less than fifteen years ago we were utterly ignorant of the fact that milk ever became a carrier of infection—yet, Mr. Earnest

Hart, of London, states that during this short period, and up to 1881, there occurred in England alone, fifty epidemics of typhoid fever, fifteen of scarlet fever, and seven of diphtheria, traced to the use of infected milk.

That the list should end here, and permanently be limited to the three diseases named, there is nothing, in the analogy of epidemics as at present understood, to warrant us for a moment in believing. At a glance, then, are we profoundly impressed with the fact that nowhere exists there greater danger to the public health than is to be found comprehended in the science of dietetics, and no aspect of it demands a more thorough and intelligent supervision, or one more worthy of our daily consideration, than the sanitary condition of the milk and meat we consume, or one better calculated to enhance the cause of sanitary science, than the practical study of those ailments which affect our food-producing animals.

The extent to which the different kinds of diseased meat are liable to be used will depend in a great measure upon the comparative frequency that these infectious maladies occur in a given locality, and the more insidious the nature of the disease the greater the liability of its transmission from animals that are being slaughtered that are more or less affected.

"All meat that would cause sickness, disease, or death in man, if partaken as food, must be regarded in the light of sanitary science as diseased, and consequently unfit for human use, in any form." Meat possessing such qualities must come from an animal affected with some form of an infectious malady, the germs of which are contained in the flesh, and are liable to be transmitted; for a disease in which a contagious virus is developed during its course, or a virulent principal generated in the blood, renders the meat from all animals thus affected exceedingly dangerous as an article of food. "Meat is not materially affected by the entozoic maladies of animals,

unless the parasite, in some stage of its existence, makes its abode in the flesh, and has not been destroyed by cooking." Practically, then, from this we conclude that there are but few diseases which absolutely render these animal supplies unfit for human use so far as yet known, prominent among which have been mentioned tuberculosis, malignant anthrax, small-pox, erysipelas, hydrophobia, and the two parasitic affections caused by the trichina spiralis and the measle tape-worms. There are, however, other maladies from which our slaughtered animals are liable to have suffered, and which may greatly impoverish the nutritive quality of the meat, and thus render it unpleasant in taste and general appearance, but if the flesh contains no animal poisons, or other morbid products, no harm can come from its use, so far as we now know, when served upon our table. And even a diseased article, when thoroughly cooked, may not prove injurious to one whose digestive powers are active. Many varieties of diseased meat are so patent that even by the dexterity of the butcher's art it is impossible to disguise them. Measly pork and beef, for instance, are easily detected by the unaided eye; but the parasitic contamination of such meat is often overlooked in the absence of official inspection or sufficient popular information regarding it, and consequently there is ever present an opportunity for a tape-worm to become initiated in all who may partake of it. The tubercular deposits, we are informed, which are found at times upon the pleural membrane lining the chest cavity of the animal, thereby causing the lungs to adhere to the ribs or along the internal walls of the abdomen, are sufficient evidence alone to condemn the carcass.

However, without a careful inquiry into the history of the article, or a microscopic inspection, it is no easy matter in all cases to decide whether meat is possessed of injurious qualities or not.

Take, for example, trichinous pork and any of the many

cases following its use; none of the victims ever suspected the meat until a peculiar form of sickness made its appearance, involving all who partook of it, and we are informed this is also true of black leg veal and other fine-looking specimens of meat that are affected with anthrax poison, and probably still other infections not yet fully made out.

To what extent trichinosis exists among the hogs of Tennessee, we have no positive information beyond the fact that it does exist in some degree, but as the larger part of the pork used in this State is imported from points north and west of us, principally from Indianapolis and Chicago, it may not be inappropriate to here digress a moment and give some facts as to the prevalence of trichinosis in the hogs found in the region from which the pork-packers of these places largely derive their supplies.

It will suffice for our present purpose to take, for illustration upon this point, the situation as we find it in the State of Indiana alone.

Dr. G. Sutton, of Aurora, Ind., says, in a report made to the American Medical Association, at its meeting last May, "We know at the present time that there is a desire to suppress facts in relation to the existence of trichina in our pork, but after an experience of ten years, in which I have examined a large amount of pork, I can say that from three to sixteen per cent. of the hogs in southeastern Indiana are infected with this parasite. The prevalence of the disease amongst the hogs varies greatly in different localities. I know that in one instance pork that was brought to my office by a farmer for examination was found to be filled with trichina. This pork, instead of being used in his family, we have the most conclusive evidence, was at once shipped to Cincinnati and sold in the market. Drs. Harding and Robbin, of Lawrenceburgh, informed me that they had microscopically examined specimens from two hundred and forty-five different hogs slaughtered in the vicinity of Lawrenceburgh, and found trichina present in forty of the

specimens, making about sixteen and one-third per cent. of all examined. Drs. Gatch and Miller, of Lawrenceburgh, also informed me that they had examined with a microscope two hundred hogs killed for pork, and found trichina in thirteen, making about six per cent. Dr. G. V. Stevenson, of Rising Sun, also wrote to me that he had found trichina in pork killed in Ohio county; and Dr. Sale, of Dillsborough, told me that he had found trichina in pork killed in that section of the country.

"We have seen notices recently, in the newspapers, that trichina had been discovered, and that trichinosis had prevailed at Liberty, South Bend, Fort Wayne, Decatur, and other places in Indiana.

"When we bear in mind that upwards of 5,000,000 of hogs are slaughtered and packed in the Western States, not including those which are put up for family use by the farmers; that if four per cent. of this pork is diseased, which we believe to be a low estimate, we have 221,484 diseased hogs put annually upon the market, or at an average of two hundred pounds to the hog, 44,296,800 pounds of diseased meat, every ounce of which, under favorable circumstances, is capable of producing disease."

Many cases of sickness which are diagnosed as typhoid fever, chronic diarrhea, etc., there are good grounds for believing, are produced by trichina.

Inspection properly performed by one who is in every way fully qualified and equipped is the most reliable means of averting the danger to health and life consequent upon partaking of animal food which is diseased, and a danger, too, that is not only, we find, unseen, but unsuspected. It is to the consideration of this danger, as it manifests itself particularly in the possible transmission of bovine tuberculosis to man, through the use of meat and milk as food, that I will now direct your attention briefly.

Reasons for suspecting that tuberculosis of the bovine species may be transmitted to man have been suggested

from time to time, but especially since the demonstration of the infectious origin of tuberculosis by Villemin in 1865. The first ground of our suspicion or alarm is that tubercle, or, as it is called, pearl-disease or consumption, is quite common in the bovine species of animals to which we trust so implicitly—one might almost say blindly—for a large part of our food; and as the production of tuberculosis is shown, by the recent discovery of Koch, to be dependent upon the presence of distinctive bacilli, which bacilli are found to exist in abundance in the pearl-nodules, as they appear in the pearly distemper of bovine animals, the identification of tuberculosis with the pearl-disease is thus clearly established. How prevalent the disease is among the cattle of Tennessee cannot at this time be stated with any approach to accuracy, as after an extensive inquiry among the dairymen and farmers in different localities throughout the State, we have failed to elicit any information which would justify our attempting even an approximation. In a large number of instances the reply came, "My attention having never been called to the subject, I have never observed particularly;" while others again stated, especially dairymen, that "occasionally they have lost a cow from consumption."

"Those who know nothing," says a distinguished writer upon veterinary medicine, "of tuberculosis, may question its claim to a place amongst what may be called the four bovine scourges, viz.: Pleuro-pneumonia, Eczema epizootica (Foot-and-Mouth disease), Cattle-plague (Rinderpest) and Tuberculosis (Pearl-disease or Consumption), but, as will be seen on studying it, it is more insidious (and equally deadly) to the stock owner than either of the other three diseases."

Tuberculosis is an inherited and chronic disease which may be present for years in the body of an animal and give rise to no symptoms. The distinctive formations of the serous membranes—the pearl-nodules of the disease—we are informed, "are sometimes found in animals that have been

slaughtered in perfect condition." But the disease in its worst form, or so far advanced as to give rise to signs and symptoms during life, "is mostly met with in milch cows, and more especially in old cows."

"The cow-houses," it is stated, "in or near large towns contained the largest proportion of diseased animals suffering from tuberculosis." The close confinement, the artificial food, the want of pure air, pure water and sunlight, to which they are here subjected, all tend to develop the disease. The cows are milked as long as it is profitable to milk them, and they are then sold, out of the herd, probably, to the butchers.

Some breeds are more liable to the disease than others, and it is said there are breeds which are entirely free from the disease.

Prof. Thomas Walley, of Edinburgh, says: "The breed of animals which, in my experience, are most subject to tubercle, are Alderneys, Guernseys (the latter in a much less degree, however, than the former), and Short-horns, amongst home cattle, and amongst foreign cattle, the Danish. It must not, however, be assumed from this remark that all Short-horns are equally predisposed; it is only in particular districts and with particular strains that this holds good. Neither would I have it assumed that all pure and highly-cultured strains are contaminated; but I do, with confidence, assert this—that quite half, if not more than half, of the well-known strains are tainted with the leprosy of scrofula. With regard to the majority of our pure breeds, I can only speak positively of those with which I am practically acquainted. In Highland cattle I have never seen tubercle, though it is very possible that those who have opportunities of seeing autopsies of old cows may have done so. In some districts Herefords are peculiarly exempt from the disease; while in others, as in some parts of North Wales, I have seen scrofula frequently developed. The old smoky-faced Montgomeryshire cattle, few though they were, during my residence amongst them, I seldom saw affected, and the same

remark holds good with reference to the old Staffordshire Long-horns. The Ayrshires in certain districts are somewhat prone to tubercle, while in others they are free from it; but, under the influence of change of climate, they become particularly predisposed. The polled Aberdeenshires seem to be particularly exempt, at least I have never seen tubercle in them; and I have it from Mr. McCombie, that he has never seen it in any cattle of the polled breed, however closely bred."

Similar information, as regards the effects of climate and locality upon the different strains in Tennessee, is especially to be desired.

Virchow places the average of the disease to be found in the cattle of Prussia at from fifteen to twenty per cent., but the amount of disease is generally put at a higher figure than that. Without adopting the most alarming estimate of the prevalence of the pearl-disease or consumption in the bovine species, there need be no hesitation in concluding that the milk of cows in a more or less advanced state of the tubercular disease is constantly being consumed by infants and adults; that, in fact, the species of domestic animals which is so much in our confidence that we even drink of one of its secretions and eat of its flesh, and sometimes even of its viscera, is a species that is widely tainted with tubercular disease. That alone is fact enough to cause uneasiness. Add to that the sort of evidence that has been obtained by experiments on animals, and we seem to have the best grounds for believing that tubercle may come to the human species from the cow. Some pathologists have proceeded by inoculating the tuberculous matter from the cow under the skin of the rabbit, or other animal, or by injecting it into their veins; while others have experimented by feeding certain of the common domestic animals with the milk of tuberculous cows, or with the actual tubercle-nodules. If all the experiments have not succeeded, a sufficient number of them have to prove that animals may be made tuberculous, either

by inoculation with tuberculous matter from the cow, or by feeding with the tuberculous substance, and even with the milk of the diseased animal.

That tuberculosis, as it exists in cattle, says Dr. Cornelius B. Fox, of South Essex, "can be conveyed to calves, rabbits, guinea pigs, etc., by the milk of an animal suffering from the disease, has been proven over and over again by Chaureau, Klebs, Gerlach, Leisering, Zurn, Bollinger and others." Klebs asserts that, when milk has been deprived of its solid particles, the tubercular virus is still found in the fluid portion, that it is not destroyed by cooking, and that it is all the more active as the disease has reached to an advanced stage. He is of opinion that the disease may be developed in children through the medium of the milk. That such milk is liable to excite diarrhea and debility in children has been recognized.

Such then are the established facts which create a presumption that the enormous consumption of cow's milk by infants particularly, and by adults, as well as the use of inferior kinds of meat—especially as is bought by the poor—is not unattended with risk, but on the contrary, and gives special significance to the fact, as shown by Fox and others recently, that but twenty-five per cent. of the cases of consumption in man are due to hereditary transmission, while the other seventy-five per cent. are caused by unsanitary influences among which should be placed prominently unwholesome food, of which infectious milk and meat will be found, we have no doubt, to be most prolific.

Then, that with increasing prevalence there exists among our cattle, especially among our milch cows, a malignant disease, which publicly is almost unknown, and one we have seen, which sustains the relation of cause and effect, in some measure at least, to that which, possibly, is the most fruitful source of human disease and death, there exists no longer room for doubt.

The subject demands, therefore, the immediate attention of our public authorities, State and municipal, and should receive a candid consideration, and the deliberation of our most enlightened minds and professional experts in the devising and enforcing of such sanitary measures as will protect our tables, control the traffic, and stamp out the disease.